IAC-05-E.6.5.05

Deriving more 'Common Benefit' from Space Telecommunications

Francis Lyall
Emeritus Professor of Public Law,
University of Aberdeen, Scotland, UK.

Abstract

The use of satellites for international and domestic telecommunications is the major avenue through which the 'common benefit' concept of Art. I of the Outer Space Treaty and its reaffirmation in UN A/RES/51/122 of 4 February 1997 is complied with. However, that benefit could be increased, and expanded beyond the realm of access to telecommunications services to provide a more directly financial element that can be distributed and/or used. This paper explores some possibilities and makes suggestions as to a 'resource allocation fee' or allowing the auction of orbital positions and appropriate spectrum band-width. Spectrum auctions have been used domestically by a number of states and experience shows such a system works. As the radio spectrum and the geostationary orbit in particular are recognised in law as scarce resources, their use should produce tangible financial benefit for all through appropriate mechanisms operated by the ITU.

---

1. Introduction

Article I, para. 1, of the Outer Space Treaty of 1967,[1] calls for the exploration and use of outer space to be 'carried out for the benefit and in the interests of all countries irrespective of their degree of economic or scientific development'. Over the subsequent thirty years questionings arose as to whether that duty was being properly complied with. In 1997 the UN General Assembly sought to stiffen the resolve of the space-competent nations.[2] Whether further similar statements will be required is moot.[3] It is a matter of ethics rather than law.[4]

One of the undoubted benefits of space, but undervalued by those who would seek even more 'benefit' from space, is the radical transformation of international telecommunications that space has produced.[5] Most countries use satellites as integral elements in their international communications, and many also use it for domestic purposes for all forms of telecommunications, including broadcasting, tele-medicine and the like. The question considered in this paper is whether that benefit can be further fostered, in the interest of developing countries through existing or new mechanisms within the International Telecommunication Union (ITU).[6] My suggestion is that it can. The operators of the new privatised space

telecommunications systems should be required to pay for the use of the 'limited natural resources'[7] from which they make their profits, and the income from such payments should be used for the general benefit. It is possible (just) to argue that Tonga's registration of various GSO positions was a way through which less-developed countries could secure some benefit from space,[8] A more generally beneficial system is desirable.

2. 'The Area' Model

ITU duties as to radio now have had a significant bias added to them, requiring particular attention to be given to the needs and interests of the developing countries.[9] Without making 'space' part of the 'common heritage of mankind' these additions have moved things on. The obvious example of the 'common heritage' concept in action is Part XI of the 1982 UN Law of the Sea Convention, as amended by the 1994 Protocol.[10] Others have already suggested that Part XI could be looked to as a model for application in space,[11] and, of course, 'common heritage' has been included in the Moon Agreement of 1979.[12] The International Sea-Bed Authority has been set up, and is now active.[13] 'The Area' can certainly be presented as an analogue to space. But we are a long way from a managerial Space Authority.[14] However, in relation to space telecommunications -- one particular use of space -- it might be that the ITU could serve as such an Authority for limited purposes. Were the ITU to be given jurisdiction to regulate (as opposed to register) the use of orbits and radio frequencies in the general world public interest, coupled with either a version of a fee or an auction option as suggested below, a considerable step would be taken towards augmenting the 'common benefit' of space for all nations.

3. The Fee option

Over the years I have wondered whether space systems should not be charged a fee.[15] There is a harbinger of such a notion within recent ITU discussions.

Most ITU expenses are paid for by allocation from the ITU Budget which is made up of contributions from member States in accordance with their selection of a class of units of contribution, and by Sector Members.[16] However, there is now another payment system within ITU procedures, the 'filing fee' introduced to cope with the problems encountered in the 1990s through the so-called 'phantom satellites'. Some States (largely acting for telecommunications entrepreneurs) having regard to the protection which priority of entry in the International Master Frequency Register affords an assignment had taken to notifying assignments in respect of satellite systems which were not fully thought out or contracted for. Means adopted included the requirement of firm 'build' and 'launch' contracts, and due diligence on the pat of notifying States. This helped, but even so it was found desirable to introduce the recovery of the cost of processing notifications. This continues.[17]

The rationale of 'cost recovery' is that those who cause cost pay for it. That is how the system is strictly applied. In the initial discussions there were suggestions that the purpose of a fee should be deterrent as well as fiscal.[18] The entrepreneurs behind each satellite system should be deterred from

filing proposals unlikely ever to eventuate in an operational system by requiring the payment of a substantial fee along with each notification to the ITU. What was then spoken of was a 'filing fee', not pure 'cost recovery'. Various forms of such a filing fee can be conceived.[19] The fee might be a 'good faith' deposit, returnable to the system operator once the system was operational. Interest on the deposit would help offset the costs of processing the notification. Again, if a working system were found not to conform to its notified data, the filing fee should be forfeit. All these suggestions had a deterrent element. The pure alternative (which is what was adopted) is that the fee be simply a 'processing fee' accurately reflecting the cost of putting the notification through the ITU procedures, and thereby helping ITU finances through making those who produce the work pay for its execution. There was also the possibility of some mixture of the two extreme 'filing fee' approaches could be taken - a proportion of the fee returnable in due course. Were the system not brought into service within a specified period, or its characteristics found not to conform to the filing, the deposit would be forfeit to the ITU.

What might be a suitable figure for such a hybrid fee was, of course, a question. A UK/Luxemburg paper of the time spoke in terms of returnable deposit of 2% of the cost of each satellite in the system multiplied by a charge for the amount of spectrum space sought, computed in units of 1000 MHz.[20] The deposit would be returned when the satellite system was up and running but were such a fee not returnable, it was suggested that it should be related clearly to the processing cost. The UK/Luxemburg paper further suggested that the first 1000 MHz of spectrum sought be exempted from such a fee in the case of purely national services systems to be set up for less-developed countries

As indicated above, the ITU settled for a strict recovery of the cost of processing a notified assignment for a new space system. This was weak. Rather we should press for what I have elsewhere called a 'resource allocation fee.'[21] Since I first suggested this the privatisations of INTELSAT, INMARSAT and EUTELSAT have gone ahead. Indeed INTELSAT is now owned by venture capitalist funds.[22] The interest of the managers of venture capital funds is the maximisation of profit for their share-holders; the actual business conducted can only be a secondary interest. The ITU Constitution notes that the radio spectrum and orbital positions are 'limited natural resources'.[23] Why should a charge not be exigible[24] for their use for business and profit purposes? The idea is not new,[25] and it has been acted on within municipal jurisdiction of particular states. A number of countries generate income for their budgets through the sale or lease of terrestrial spectrum space. In them those who gain commercially by the use of a general natural resource appear to be willing to pay for it.[26] How a state goes about deciding who gets what spectrum varies from state to state. We will come to 'auctions' in the next section. It may be noted, however, that the FCC has used a lottery system to allocate some domestic television and many radio licences.

Why should this 'benefit' be sporadic and patchy, depending on the willingness of particular states to

implement such a system and be confined to the states which are willing to 'claim' portions of the radio spectrum and then put the resulting income into their own coffers? In the case of space systems the resources being so used are general resources attributable to the world as a whole. The precedent of the benefit obtained from the exploitation of the resources of the Area under Part XI the 1982 Convention on the Law of the Sea is fully relevant.

Other questions would arise were this to be taken further. What would be the basis of assessment? The calculation based on the number of satellites in a system, their individual cost, the extent of the spectrum band used, and a flat rate per 1000 MHz. with some exemption for systems serving less developed countries is attractive.[27] Should such a 'utilisation fee' be 'one-off', or a yearly figure scaled to the coming into operation of a system, or a fixed continuing annual payment as indicated above?[28] I see no reason why there should not be an annual 'fee'. A 'scaled' fee would easily be suitably incorporated into the running costs of a commercial enterprise.[29] Who should administer it? - The ITU is the obvious candidate.

4. The Auction Option

The allocation of resources by governments is always contentious, particularly when the resource is scarce and there are more seeking the resource than can be accommodated. This is aggravated when no-one has a clear idea of an objective value. In these circumstances resort to an auction mechanism can be a solution, providing a relatively transparent, objective, cheap and efficient method of decision-making, and passing any 'risk' to bidders who make their own judgements as to the balance of 'cost' and possible 'return'. The theory is that decisions are market-driven, and therefore more responsive to judgment of those working in the area.[30] Thus in the UK we have had various rounds of auctions for the exploration and exploitation of various defined 'blocks' in the UK Continental Shelf.

In recent years various countries have begun auctioning licences to use various parts of the radio spectrum.[31] New Zealand was the first country actually to do so. Its Radiocommunications Act of 1989 introduced property rights in radio spectrum and market driven allocation mechanisms for their distribution.[32] The US Federal Communications Commission has also made extensive use of the auction device.[33] In the main auctions have been for the allocation of broadcasting licences,[34] although the UK, Germany and other EU states have used auctions in the allocation of licences for 3G mobile phone spectrum. The sums involved are not negligible. As a result of the UK 3G auction the Treasury received GBP 22.5 billion,[35] a sum much criticised in the press, and which may have had a (temporary) crippling effect on the successful bidders.

At present no state has auctioned satellite telecommunications licences,[36] but why should they not? There is now an extensive literature discussing various methods of performing auctions for the allocation of resources. Not all are in favour of such systems, and difficulties and problems can be identified.[37] There is, for example the question of whether the general public interest is properly met by allocation by auction unless the process is to some extent rigged, or

interfered with in order to protect some basic interests.[38] Possibilities for conducting such auctions include straight 'bids' with open bidding, closed bidding, 'Dutch' auctions, auctions with several rounds and so on. We need not go into such.[39] Suffice it to say that in order to maximise the consequent revenue without bankrupting the winner, the design of each auction will depend on the nature of the resource concerned, the variety, nature and number of the interests involved.[40]

The question is, therefore, whether such a system could work for space satellite systems. It is suggested that it could.[41] And it would not contravene the Space Treaties.[42]

5. Conclusion: general questions.

All states benefit from satellite telecommunications. My basic question is: should not the profit which clearly can be derived commercially for those who provide satellite telecommunications for profit be shared by the world at large, thus increasing compliance with the principle that the use of outer space shall be for the benefit of all.[43] States have been profiting from entrepreneurs' willingness to pay a fee, or bid for the rights to use spectrum space in a national context. Why should this willingness not be exploited for the benefit of all by extending it to space systems? But if we do it should not benefit the coffers of only some states. Could we do otherwise?

Such 'benefit' could be increased by the payment of a fee for the use of the limited natural resources of orbit and spectrum which commercial enterprises use. Such a fee could be either a one-off payment, exigible when formal notification of a proposed system is made to the ITU, or, preferably, through an annual payment. In either case the fee should be based on the number of satellites in the particular system, together with the volume or amount of radio spectrum the system uses.

The forgoing assumes agreement as to the 'fee' to be paid and its component elements. An alternative would be to base the 'fee' on bids through an auction process.

Of course this raises various questions, and doubtless opposition from those who would see it as an unlawful tax on enterprise.[44] Certainly the second paragraph of Art. I of the Outer Space Treaty speaks of the use of space being 'free'? But does the term 'free' mean simply 'available to all', or does it preclude a financial aspect over and above the cost of getting there? I would suggest a 'fee' is not excluded by the word 'free'.

Who should administer any such system? The obvious answer is the ITU. It is already maintaining the sort of register and procedures which would be needed to operate any system of 'fee', 'recurrent fee', or 'auction' such as envisaged above.

Last, what should be done with the income generated from a fee system or an auction process? Of course those subject to the fee could argue that, in appropriate cases it should be returned as subsidy for maintaining uneconomic services, but that would merely invite abuse.[45] It would also be a problem in relation to many telecommunication uses such as direct broadcast for educational purposes (as in India), tele-medicine, disasters,[46] or even television relay systems which may be irregular in their use.[47] Such problems could be worked out. There is sufficient commercial and entrepreneurial use of space systems to

provide a reasonable income stream from a resource utilisation fee. My own preference would be to make the sums available to the UN system, perhaps fostering development (perhaps in the work of ITU-D), or in the refugee programmes, or such as World Health.[48] But such a discussion takes us into very different waters which I would prefer to tackle elsewhere.

NOTES

[1] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies, 1967, (1968) 610 UNTS 205; (1968) UKTS 10, Cmnd. 3519; 18 UST 2410, TIAS 6347; 6 ILM 386; 61 AJIL 644.

[2] The Declaration on International Co-operation in the Exploration and Peaceful Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries' GA Res. 51/122, 4 February 1997; cf. M. Benko and K. Schrogl, 'The 1996 UN Declaration on "Space Benefits" Ending the North-South Debate on Space Co-operation' (1996) 39 *Proc. IISL* 183-6.

[3] I use the term 'moot' in its proper (English) meaning of 'uncertain, but capable of later determination when further data is available', and not the US term, which means 'uncertain but unimportant and therefore to be disregarded'.

[4] The prevailing Western dogma asserts itself to be based on Adam Smith's *Wealth of Nations* (Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, (Oxford: Oxford U.P., 1993). (Cf. C.R. Fay, *Adam Smith and the Scotland of his Day* (Cambridge: Cambridge UP, 1956); E. Rothschild, *Economic Sentiments: Adam Smith, Concordet, and the Enlightenment* (Cambridge, Mass.: Harvard UP, 2001)). But the context of Smith's thought was an environment of traders that knew each other, and might take decisions on character as well as profit. Modern commerce is a rather different animal from his, and when hiding behind Smith's "invisible hand" is wrongly focussed only on profit. Cf. Philippians 2.4: 'Each of you should look not only to your own interests, but also to the interests of others'.

[5] We should not underestimate the contribution of fibre-optic cables to international communications; indeed these cables now carry a high proportion of international traffic. But the fact remains that cable networks are not as versatile as satellite systems. Of course, ideally, the two should cooperate. On occasion they do, as when in June 2005 a break in the cable connecting Pakistan with the world cabling system cut that country off from the world-wide web. Temporarily much of the Pakistan web communications was diverted to satellite relays.

[6] The ITU has published a consolidated text of the current state of the ITU Constitution and Convention together with relevant Resolutions and Recommendations in force from 2003: *Collection of the basic texts of the International Telecommunication Union adopted by the Plenipotentiary Conference*, 2d Ed. 2003, (Geneva: ITU, 2003). The ITU Constitution (CS) is the basic Instrument (CS art. 4.2 (30)) and is intended to contain provisions less likely to change at successive plenipotentiaries, the ITU Convention (CV) containing other constitutional matters (CS art. 4.1

and 2 (29-30)). 'CS' indicates a reference to the Constitution, while 'CV' refers to the Convention. Given the complexity and length of some articles, it is convenient to use the paragraph numbering in either document. This paper does both.

[7] See text at n. 23 below.

[8] See R. Jakhu, Commentary Paper in 'Expanding Global Communications Services' in Proceedings of the Workshop on Space Law in the Twenty-first Century, UNISPACE III Technical Forum, July 1999, (UN OOSA ST/SPACE/2) at 91-92; cf. D. Riddick, 'Why does Tonga own Outer Space?' 19 *Air and Space Law*, 15-29; JC Thompson, 'Space for Rent: The International Telecommunications [sic] Union, Space Law, and Orbit/Spectrum Leasing', 1996 62 *J. Air Law and Comm.* 279-311 at 280-283 and 300-302. See also R. Freiden, below n. 41, at 307-308. Notwithstanding Prof. Jakhu, the Tonga episode really was an abuse of the ITU system, which the ITU should have had the guts to reject, implying the power to do so from its general range of duties.

[9] ITU CS arts. 17.1.1 (104) and 21.1.2 ((119) include particular consideration of the interests of developing countries, and CV art. 17 (214-215B). This point was made by Stephan Hobe, but as at August 2005 neither he nor I can recall precisely where.

[10] UN Convention on the Law of the Sea, 1982; (1982) 21 ILM 1261 as amended by the 'Agreement to Implement Part XI of the Law of the Sea Convention, UNGA Res. 48/263, (1994) 33 ILM 1309); 1833 UNTS 3; (1999) UKTS 81, Cm. 4524 (Treaty) and (1999) UKTS 82, Cm. 4525 (Part IX Amendment); see conveniently, *The Law of the Sea, United Nations Convention on the Law of the Sea*, (UN 1997, Sales No. E.97.V.10).

[11] As an example of the analogue suggested even before the 1982 Convention, see CQ. Christol, 'Space Law Analogies for the Sea-Bed and Ocean Floor', 1968 *Proc. IISL* 318-325.

[12] Art. 11.1 of the Agreement Governing the Activities of States on the Moon and other Celestial Bodies, 1363 UNTS 3; A/RES/34/68; (1979) 18 ILM 1434.

[13] See http://www.isa.org.jm

[14] I remain convinced that the ITU should be developed along these lines. Cf. 'The International Telecommunication Union: A World Communications Commission?' 1994 37 *Proc. IISL* 42-7, my first attempt to argue the point.

[15] See F. Lyall, 'Expanding Global Communications Services' in *Proceedings of the Workshop in Space Law, UNISPACE III,* July 1999. (A.CONF-184/7) 63-80; and 'The Rational, Efficient and Economic Use of Space: Three Suggestions', M. Benko ed., *Air and Space Law in the 21st Century: Liber Amicorum K-H Bocksteigel* (Cologne: Carl Heymann Verlag, 2002) 386 – 395.

[16] The 'Finances of the Union' are largely dealt with in CS art. 28 (155-170) and CV art. 33 (468-487).

[17] 'Implementation of processing charges for satellite network filings and administrative procedures', Res. 88 (Minneapolis 1998, rev. Marrakesh, 2002), and 'Cost recovery for some ITU products and services', Res. 91 (Minneapolis 1998). For the earlier rules see H. Wong, 'The Paper "Satellite" Chase: The ITU Prepares for

its Final Exam in Resolution 18', 1998 63 *J. Air Law and Comm.* 849-879;

[18] See A. Noll, 'The Space-law related Role, Activities and Contributions of the International Telecommunication Union in the last decade of the 20th Century'; in *International Organisations and Space Law*, Proceedings of the Third ECSL Symposium, Perugia, Italy, May 1999 (ESA SP-442), 109-127, at 121-122, paras. 35-38.

[19] F. Lyall, 'Paralysis by Phantom: Problems of the ITU Filing Procedures' 1997 39 *Proc IISL* 187-93.

[20] "Due Diligence Considerations", UK/ Luxemburg June 1996, submitted as part of the work of RAG96.

[21] Cf. F. Lyall, 'Expanding Global Communications Services' in *Proceedings of the Workshop in Space Law, UNISPACE III,* July 1999, (A.CONF-184/7) 63-80, and 'The Rational, Efficient and Economic Use of Space: Three Suggestions', in M. Benko ed., *Air and Space Law in the 21st Century: Liber Amicorum K-H Bocksteigel* (Cologne: Carl Heymann Verlag, 2002) 386 – 395.

[22] See 'In the Matter of Intelsat, Ltd., Transferor, and Zeus Holdings Limited, Transferee', FCC IB Docket No. 04-366; Release No. DA 04-4034; Adopted and Released 22 December 2004; 2004 FCC LEXIS 7267, in which the FCC approved the transfer of ownership of INTELSAT to Zeus Holdings as meeting the requirements of the US Open-Market Reorganisation for the Betterment of International Telecommunications Act (the ORBIT Act) of 2000 (Pub. Law 106-180, 114 Stat. 48), as amended.

[23] ITU CS art. 44.2 (16). Note that reference is to orbits – the statement is not confined to the GSO.

[24] This is a good word. While it just means 'chargeable', I recommend its use as being more peremptory than the other.

[25] H.J. Levin, *The Invisible Resource: Use and Regulation of the Radio Spectrum,* (Baltimore MD: Johns Hopkins Press, 1971).

[26] Famously the newspaper magnate, the late (Canadian) Roy Thomson, later (UK) Lord Thomson of Fleet, categorised his success in securing the first UK licence to run a commercial tv business as 'a licence to print money'.

[27] See text at n. 20 above.

[28] See 'Due Diligence Considerations', UK/Luxemburg June 1996, submitted as part of the work of RAG96 for the 1997 WARC) above, n. 20.

[29] Annual fees are common in UK spectrum licences: see e.g. the Wireless Telegraphy (Licence Charges) Regulations 1999, 1999 SI No. 1774.

[30] There is an increasing literature on the concept of 'Law-and-Markets'. See M. Abramowicz, 'The Law-and-Markets Movement', 1999-2000 49 *Am. U.L. Rev.* 327-431.

[31] See the early suggestion by R.H. Coase, 'The Federal Communications Commission' (1959) 2 *J. Law and Econ.* 1-40. Countries using auctions include the US, UK, India, Germany, Nigeria and New Zealand.

[32] The seventh round of NZ spectrum auctions took place in October 2004: see http://www.med.govt.nz/rsm/auctions/

[33] G.L. Rosston and J.S. Steinberg, 'Using Market-based Spectrum Policy to promote the Public Interest', 1997 FCC LEXIS 384; A. Grunwald, 'Riding the US wave: spectrum auctions in the digital age', 2001 25 *Telecommunications Policy* 719-728; T.M. Valletti, 'Spectrum Trading', 2001 25 *Telecommunications Policy* 655-670.

For FCC data, see http://wireless.fcc.gov/auctions/default.htm?job=auctions_home. Google 'spectrum auction' for many relevant sites and data.

[34] Cf. I. Coe, 'Legal Issues surrounding Spectrum Auctions', (1998) 41 *Proc. IISL.* 194-204; Australian Communications Authority, Spectrum Licence Allocations, 28 GHz and 31 GHz Bands, March 1998. Invitation to Comment, March 1998.

[35] As to the UK see 'The Auction of Radio Spectrum for the Third Generation of Mobile Telephones', National Audit Office, Report by the Comptroller and Auditor General, 2001-2002, HC 233, 19 October 2001: Cf. L. Green of the UK Radiocommunications Agency: 'The UK Approach to Spectrum Valuation and Pricing' at http://www.ofcom.org.uk/static/archive/ra/topics/spectrum-price/documents/idee.htm. See also Klemperer and Milgrom, below, n. 40.

[36] The US has auctioned DBS licences involving both spectrum and orbital location see *In the Matter of Auction of Direct Broadcast Satellite Licenses*, 19 FCC Rcd. 820; 2004 FCC LEXIS 173, Release Number FCC 04-8, Adopted January 5, released January 15, 2004, where the assignments were as to DBS orbital positions allocated to the US by the 1983 ITU Regional Administrative Radio Conference. The FCC may not use competitive bidding for the provision of international or global satellite communications services: see §647, Open-Market Reorganisation for the Betterment of International Telecommunications Act, 2000, (the 'ORBIT Act'); Pub. L. No. 106-180, 114 Stat. 48, §647, codified at 47 USC §765f.

[37] M. Scanlan, 'Hiccups in US spectrum auctions', 2001 25 *Telecommunications Policy* 689-701; P.S. Ryan, 'Application of the Public-Trust Doctrine and Principles of Natural Resource Management to Electromagnetic Spectrum, 2004 10 *Mich. Telecomm. Tech. L. Rev.* 285-372. Cf. Abramowicz, above. n. 30.

[38] For example, small broadcasters may be protected to ensure that broadcasting does not become concentrated in the hands of a few, with a consequent suppression of diverse viewpoints.

[39] Particularly as I do not understand them all.

[40] P. Klemperer, 'What Really Matters in Auction Design', 2002 16 *J. of Economic Perspectives*, 169-189; *Auctions: Theory and Practice*, (Princeton: Princeton UP, 2005); also http://www.nuff.ox.ac.uk/users/klemperer/spectrumindex.htm; P. Milgrom, *Putting Auction Theory to Work*, (Cambridge, CUP and Stanford UP, 2004). For the UK, see the Wireless Telegraphy Act 1998 ss. 1 and 3 permitting the use of auctions, and the related www.spectrumauctions.gov.uk/auction/text_sums/websum2e150.html

[41] R. Frieden, 'Balancing Equity and Efficiency Issues in the Management of Shared Global Radiocommunication Resources', 2003 24 *U. Pa. Int'l. Econ. L.* 289-327.

[42] JC Thompson, 'Space for Rent: The International Telecommunication Union, Space Law and Orbit/Spectrum Leasing' 1996 62 *J. Air Law and Comm.*, 279-311, at 308-309, and quoting articles I had not read when writing this paper.

[43] Outer Space Treaty, art. 1 para. 1.

[44] I put such notions to the ITU Secretary-General's Reform Advisory

Panel. At our meeting it was amusing, appalling and somewhat depressing to see how swiftly they were dismissed by those representing commercial interests (which category seemed not to be restricted to companies).

[45] An argument might be put that such fees should be used to subsidise the 'life-line connectivity' services envisaged in the revised INTELSAT agreement, and operated by the privatised INTELSAT. Cf. my Vancouver paper, 'The Protection of the Public Interest in the Light of the Commercialisation and Privatisation of the Providers of International Satellite Telecommunications' 2004 47 Proc. IISL 441-451.

[46] Cf. the Disaster Charter: http://www.disasterscharter.org/main_e.html

[47] All news TV providers make occasional uses of satellite services. They should be able to amortise a fee cost in their basic tariffs.

[48] I am aware of the considerable reservations as to the efficiency of UN and other 'development programmes'.